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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/136,680	08/19/1998	CHRISTOPHE J. CHEVALLIER	703.032US1	2027

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NGUYEN, LUONG TRUNG

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 02/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/136,680	CHEVALLIER, CHRISTOPHE J.	
	Examiner	Art Unit	
	LUONG T NGUYEN	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *12/16/2002* is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 12/16/2002 have been fully considered but they are not persuasive.

In re page 6, Applicant argues that Applicant can not find where Schmidt or Zhou, either alone or in combination, teach such a monolithic substrate.

In response, regarding claim 1, the Applicant amended claim 1 with the limitation "a monolithic substrate". The Examiner considers that claim 1 as amended still do not distinguish from Schmidt patent in view of Zhou et al. patent. Schmidt discloses that the photocard can be placed on a single integrated circuit, and the device is fabricated on a single chip (a monolithic substrate, column 5, lines 15-21).

In re page 6, Applicant argues that Applicant can not find where Schmidt or Zhou, either alone or in combination, teach a level of protective material on the array of non-volatile memory cells as recited in claim 1. In response, regarding claim 1, the Applicant amended claim 1 with the limitation "a level of protective material fabricated over the array of non-volatile memory cells for blocking the light received by the CMOS image sensor". The Examiner considers that claim 1 as amended still do not distinguish from Schmidt patent in view of Zhou et al. patent. However, Zhou et al. disclose an integrated sensor with frame memory in which a metal is used for light shield in the frame memory array (column 7, lines 14-18).

In re pages 6-7, Applicant argues that Applicant traverses the rejection of claim 1 based on a lack of a motivation to combine Zhou with Schmidt. And Applicants requests clarification how image quality would be increased.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, by applying the teaching of light shield in a frame memory in Zhou et al. into the device of Schmidt, the amount of incident light to the memory of Schmidt will be reduced, the deterioration of image quality due to smear and dark current is eliminated and therefore the image quality is increased.

In re page 7, Applicant argues that Applicant can not find where Schmidt or Zhou, either alone or in combination, teach such a single integrated circuit.

In response, regarding claim 8, the Applicant amended claim 8 with the limitation "a single integrated circuit". The Examiner considers that claim 1 as amended still do not distinguish from Schmidt patent in view of Zhou et al. patent. Schmidt discloses that the photocard can be placed on a single integrated circuit, and the device is fabricated on a single chip (column 5, lines 15-21).

In re page 7, Applicant argues that Applicant can not find where Schmidt or Zhou, either alone or in combination, teach a level of protective material on the array of non-volatile memory cells as recited in claim 8. In response, regarding claim 1, the Applicant amended claim 1 with the limitation "a level of protective material fabricated over the non-volatile memory unit for blocking the light received by the CMOS imager". The Examiner considers that claim 8 as amended still do not distinguish from Schmidt patent in view of Zhou et al. patent. However, Zhou et al. disclose an integrated sensor with frame memory in which a metal is used for light shield in the frame memory array (column 7, lines 14-18).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 4-6, 8-25, 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 6,278,481) in view of Zhou et al. (US 5,909,026).

Regarding claims 1, 8, 13, Schmidt discloses a digital camera comprising a monolithic substrate (a single integrated circuit, column 5, lines 15-21); a CMOS image sensor (CMOS imager 505, figure 5, column 10, lines 26-39); a frame memory (RAM

memory 515, figure 5, column 10, lines 40-48); an array of non-volatile memory cells (buffer SRAM 525, figure 5, column 10, lines 40-48).

Schmidt fails to specifically disclose a level of protective material fabricated over the array of non-volatile memory cells for blocking the light received by the CMOS image sensor. However, Zhou et al. disclose an integrated sensor with frame memory in which a metal is used for light shield in the frame memory array (column 7, lines 14-18). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt by the teaching of Zhou et al. in order to prevent incident light from contacting to the charge stored in the memory. This makes the deterioration of image quality due to smear and dark current is eliminated. Therefore the image quality is increased.

Regarding claims 4, 9, 22, Zhou et al. disclose wherein the level of protective material is fabricated as part of the CMOS image sensor (column 7, lines 4-19).

Regarding claims 5, 14, 17, 24, Schmidt and Zhou et al. fail to specifically disclose wherein the level of protective material is a layer of metal fabricated as an interconnect for electrically connecting the CMOS image sensor and other circuits on the substrate. However, Zhou et al. disclose protective material is a layer of metal (column 7, lines 14-19). It would have been obvious to use this metal layer as a conductor for connecting the CMOS imager and other circuits on the substrate in order to reduce cost and size of the camera.

Regarding claim 6, 25, Schmidt fails to specifically disclose wherein the CMOS image sensor comprises an active pixel array. However, Zhou et al. disclose an active pixel array APS 110 (figure 1A, column 3, lines 24-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt by the teaching of Zhou et al. in order to allow non-destructive readout and random access (column 1, lines 43-44).

Regarding claim 10, Schmidt discloses a micro-controller for controlling transfer image from CMOS imager to non-volatile memory unit (microcontroller 510, figure 5, column 10, lines 40-48).

Regarding claim 11, 23, Schmidt and Zhou et al. fail to specifically disclose the non-volatile stores program code information for controlling the microcontroller. However, Schmidt discloses SRAM memory 525, figure 5 (non-volatile memory) and EEPROM program memory 520 to store instructions (figure 5, column 10, lines 40-48). It would have been obvious to include EEPROM program memory 520 in SRAM memory 525 to make a single memory. This reduces the size of the device.

Regarding claims 12, 18, Schmidt discloses a digital signal processor (microcontroller 510, figure 5, column 10, lines 40-48).

Regarding claims 15-16, all the limitations are contained in claim 8 and 10. Therefore, see Examiner's comments regarding claims 8 and 10.

As for claims 27-28, all the limitations are contained in claim 1 and 5. Therefore, see Examiner's comments regarding claims 1 and 5.

Regarding claim 19, Schmidt discloses a digital camera comprising a single integrated circuit (a single integrated circuit, figure 5, column 5, lines 15-21); a CMOS image sensor (CMOS imager 505, figure 5, column 10, lines 26-39); an analog to digital converter (A/D conversion of the image is performed on the CMOS imaging chip 505, figure 5, column 10, lines 45-48); a frame memory (RAM 515, figure 5, column 10, lines 40-48); a data compression/decompression unit (JPEG circuit 445, figure 4, column 9, line 59 - column 10, line 5); a non-volatile memory unit (SRAM 525 figure 5, column 10, lines 40-48); a microcontroller (microcontroller 510, figure 5, column 10, lines 40-48). Schmidt fails to specifically disclose a layer of protective material fabricated over the non-volatile memory unit for blocking the light received by the CMOS imager. However, Zhou et al. disclose an integrated sensor with frame memory in which a metal is used for light shield in the frame memory array (column 7, lines 14-18). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt by the teaching of Zhou et al. in order to prevent incident light from contacting to the charge stored in the memory. This makes the

deterioration of image quality due to smear and dark current is eliminated. Therefore the image quality is increased.

Regarding claim 20, Schmidt discloses a digital signal processor (microcontroller 510, figure 5, column 10, lines 40-48); a digital to analog converter (digital to analog converter 530, figure 5, column 10, lines 40-48); an electronic view finder (monitor, column 11, line 11).

Regarding claim 21, Schmidt discloses the non-volatile memory unit (memory 515, figure 5) is fabricated adjacent to the CMOS image sensor (CMOS imager 505, figure 5).

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 6,278,481) in view of Zhou et al. (US 5,909,026) further in view of Komori et al. (US 6,255,690).

Regarding claim 2, Schmidt and Zhou et al. fail to specifically disclose wherein each memory cell is a field effect transistor with a floating gate. However, Komori et al. disclose a semiconductor integrated circuit device having a non-volatile memory circuit which is a field effect transistor with a floating gate (column 3, lines 15-21). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt and Zhou et al. by the teaching of Komori et al. in

order to reduce the cell area and to attain a high integration density (column 1, lines 55-58).

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 6,278,481) in view of Zhou et al. (US 5,909,026) further in view of Ross (US 5,241,412).

Regarding claim 3, Schmidt and Zhou et al. fail to specifically disclose wherein the protective material is polyamide. However, Ross discloses opaque material (protective material) is polyamide (figure 4, column 5, lines 45-46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt and Zhou et al. by the teaching of Ross in order to prevent incident light from contacting to the charge stored in the memory. This increases image quality.

6. Claims 7, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 6,278,481) in view of Zhou et al. (US 5,909,026) further in view of Kempainen (CMOS Image Sensors: ECLIPSING CCDs in Visual Information?, www.ednmag.com, October 9, 1997).

Regarding claims 7 and 26, Schmidt and Zhou et al. fail to specifically disclose wherein the CMOS imager comprises a passive pixel array. However, Kempainen discloses CMOS pixel-array construction uses active or passive pixels (page 102, third column). Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to modify the device in Schmidt by the teaching of Zhou et al. in order to achieve high "quantum efficiency" (page 102, third column).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Luong Nguyen** whose telephone number is **(703) 308-9297.** If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Wendy Garber**, can be reach on **(703) 305-4929.**

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231
Or faxed to:
(703) 872 - 9314

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA. Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

LN LN
2/20/2003

WENDY R. GARBER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600